System board D2130 for RX220

Technical manual

Edition September 2005

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1 Introduction

This technical manual describes the system board D2130, which can be equipped with one or two AMD Opteron™/Dual Core Opteron™ processors.

Further information about drivers is provided in the readme files on the hard disk, on the supplied "ServerSupport" or "ServerStart" CDs.

You will find further information in the BIOS description "D2130 Setup Utility for RX220".

Notational conventions

The meanings of the symbols and fonts used in this manual are as follows:

italics	indicates commands, menu items, file and path names or software programs
`fixed font`	indicate system output on the monitor
`semi-bold fixed font`	indicates values to be entered through the keyboard
[Key symbol]	indicates keys according to their representation on the keyboard If capital letters are to be entered explicitly, then the Shift key is shown, e.g. [SHIFT] - [A] for A. If two keys need to be pressed at the same time, then this is shown by placing a hyphen between the two key symbols.
“quotation marks”	indicates names and terms that are being emphasized.
►	indicates an operation that to be performed
CAUTION!	indicates warnings, which, if ignored, will endanger your health, destroy the system or lead to the loss of data.
	indicates additional information, notes and tips

Table 1: Notational conventions

2 Important notes

In this chapter you will find essential information regarding safety when working with your server.

CAUTION!

With the system board installed you must open the system to access the system board. How to dismantle and reassemble the system is described in the Options Guide accompanying your system.

2.1 Notes on safety

CAUTION!

- The actions described in these instructions should only be performed by authorized, qualified personnel. Equipment repairs should only be performed by qualified staff. Any failure to observe the guidelines in this manual, and any unauthorized openings and improper repairs could expose the user to risks (electric shock, fire hazards) and could also damage the equipment. Please note that any unauthorized openings of the device will result in the invalidation of the warranty and exclusion from all liability.
- Transport the device only in the antistatic original packaging or in packaging that protects it from knocks and jolts.
- Only install expansions that are allowed for the system board. If you install other expansions, you may damage the requirements and rules governing safety and electromagnetic compatibility or your system. Information on which system expansions are suitable can be obtained from the customer service centre or your sales outlet.
- The warranty expires if the device is damaged during the installation or replacement of system expansions.

- Components can become very hot during operation. Ensure you do not touch components when making extensions to the system board. There is a danger of burns!
- Transmission lines to peripheral devices must be adequately shielded.
- To the LAN wiring the requirements apply in accordance with the standards EN 50173 and EN 50174-1/2. As minimum requirement the use of a protected LAN line of category 5 for 10/100 MBps Ethernet, and/or of category 5e for Gigabit Ethernet is considered. The requirements of the specification ISO/IEC 11801 are to be considered.
- Never connect or disconnect data transmission lines during a storm (lightning hazard).

Batteries

CAUTION!

- Incorrect replacement of lithium battery may lead to a risk of explosion. The batteries may only be replaced with identical batteries or with a type recommended by the manufacturer.

  It is essential to observe the instructions on page 29.

Modules with electrostatic-sensitive components

Systems and components that might be damaged by electrostatic discharge (ESD) are marked with the following label:

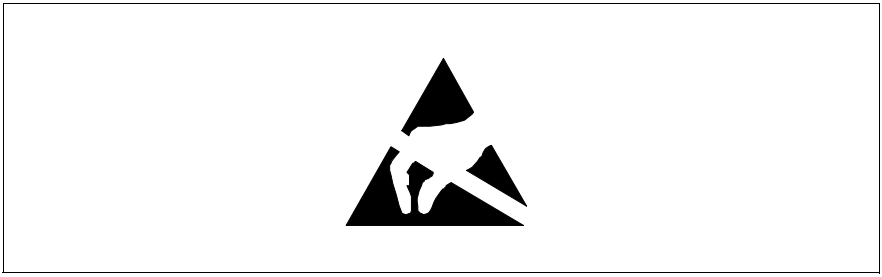

Figure 1: ESD label

When you handle components fitted with ESDs, you must observe the following points under all circumstances:

- You must always discharge yourself of static charges (e.g. by touching a grounded object) before working.
- The equipment and tools you use must be free of static charges.
- Remove the power plug from the power socket before inserting or removing boards containing ESDs.
- Always hold boards with ESDs by their edges.
- Never touch pins or conductors on boards fitted with ESDs.
- Use a grounding cable designed for this purpose to connect yourself to the system unit as you install/deinstall the board.
- Place all components on a static-safe base.

i You will find a detailed description for handling ESD components in the relevant European or international standards (EN 61340-5-1, ANSI/ESD S20.20).

Notes about boards

- During installation/deinstallation of the system board, observe the specific instructions described in the service manual for the server.
- Remove the plug from the mains outlet so that system and system board are totally disconnected from the mains voltage.
- To prevent damage to the system board, the components and conductors on it, please take great care when you insert or remove boards. Take great care to ensure that extension boards are slotted in straight, without damaging components or conductors on the system board, or any other components, for example EMI spring contacts
- Be careful with the locking mechanisms (catches, centring pins etc.) when you replace the system board or components on it, for example memory modules or processors.
- Never use sharp objects (screwdrivers) for leverage.

2.2 CE certificate

CE

The shipped version of this board complies with the requirements of the EEC directive 89/336/EEC "Electromagnetic compatibility".

Compliance was tested in a typical PRIMERGY configuration.

2.3 Environment protection

Environmentally-friendly product design and development

This product has been designed in accordance with the Fujitsu Siemens Computers standard for “environmentally friendly product design and development”. This means that key factors such as durability, selection and labeling of materials, emissions, packaging, ease of disassembly and recycling have been taken into account.

This saves resources and thus reduces the harm done to the environment.

Notes on saving energy

Devices that do not have to be on permanently should not be switched on until they need to be used and should be switched off during long breaks and on completion of work

Notes on packaging

Please do not throw away the packaging. You may need it later for transporting your system unit. If possible, the device should only be transported in its original packaging.

Notes on dealing with consumables

Please dispose of printer consumables and batteries in accordance with local government regulations.

Do not throw batteries and accumulators into the household waste. They must be disposed of in accordance with local regulations concerning special waste.

All batteries containing pollutants are marked with a symbol (a crossed-out rubbish bin on wheels). In addition, the marking is provided with the chemical symbol of the heavy metal decisive for the classification as a pollutant:

Cd Cadmium
Hg Mercury
Pb Lead

Notes on labeling plastic housing parts

Please avoid attaching your own labels to plastic housing parts wherever possible, since this makes it difficult to recycle them.

Returning, recycling and disposal

The device may not be disposed of with household rubbish. This appliance is labelled in accordance with European Directive 2002/96/EC concerning used electrical and electronic appliances (waste electrical and electronic equipment - WEEE).
The guideline determines the framework for the return and recycling of used appliances as applicable throughout the EU. To return your used device, please use the return and collection systems available to you. You will find further information on this at *www.fujitsu-siemens.com/recycling*.

For details on take-back and reuse of devices and consumables within Europe, see the manual „Returning used devices“ or contact your Fujitsu Siemens Computers branch office/subsidiary or our recycling center in Paderborn:

Fujitsu Siemens Computers
Recycling Center
D-33106 Paderborn
Germany

Tel. +49 5251 8 18010

Fax +49 5251 8 18015

Internet: www.fujitsu-siemens.com/recycling

3 Features

3.1 Overview

Processors

- 1 or 2 x AMD Opteron™/Dual Core Opteron™ processors
- 2 processor sockets 940 for AMD Opteron™/Dual Core Opteron™ processors with 2.0 GT/ 1.6 GT HyperTransport bandwidth

Main memory

- 8 slots for main memory DDR1/400 MHz (registered), SDRAM memory modules, dual channel with 2 modules per channel with 512 MB, 1 and 2 Gbyte
- maximum 16 Gbyte of memory
- ECC multiple bit error detection and single bit error correction
- memory scrubbing function

Chips on the system board

- ServerWorks HT-2000 (Northbridge)
- ServerWorks HT-1000 (Southbridge)
- 2 embedded dual Broadcom Gigabit LAN controllers
- VGA controller (ATI Radeon 7000M) onboard with 16 MB SDRAM memory
- SATA controller Promise PDC20319u
- Super I/O controller (NS PC87417)
- Flash EPROM for:
  - BIOS
  - LAN
  - Server Management (SM)
- server management with BMC (FSC System)
- thermal and system management controller (ADM1026)

Internal connectors

- panel connector to front panel
- 1 IDE connector (CD-ROM/DVD-ROM)
- Baseboard Management connector (for BMC)
- USB connector
- HDD activity connector
- IPMB connector
- 2 Serial ATA connectors
- auxiliary power connector for FSC RSBS2-LP card
- 8-pin ATX 12V connector
- 24-pin ATX power connector
- battery holder
- panel connector to fan backplane
- connectors for PWM fans (Puls Wide modulation)

External connectors

- 1 serial port (COM1) for system and BMC (shared)
- 2 PS/2 interfaces for keyboard and mouse
- 2 USB 2.0 ports with 480 Mbits/s
- 1 VGA port
- 2 LAN (RJ-45) ports

Slots

- 1 x PCI-X 133 MHz/64 Bits 184P (PCI-X 1.0)
- 1 x PCI Express x8 slot 98P (PCI Express 1.0a)

BIOS features

- AMI BIOS
- 8 Mb
- Special Hardware write protection
- Standards
  - Green
  - PnP
  - DMI
  - WfM 2.0
  - ACPI 2.0a
  - SMBIOS 2.3
- USB Boot device
  - FDD
  - ZIP
  - HDD
  - CD
  - USB stick
- HDT support
- Optional ROM for LAN x 2
- Shadow RAM in C, D, E segment with 4 KB alignment
- Console redirection support

Environmental protection

Battery in holder

Form factor

E-ATX (SSI) 12.4 x 13 in.

3.2 Main memory

The system board supports up to 16 Gbyte main memory. Eight slots (four memory banks with two slots each) are available for the main memory. Each memory bank can be populated with two 512 Mbyte, 1 Gbyte or 2 Gbyte registered DDR1/400 MHz (PC-3200) memory modules.

ECC with memory scrubbing and with the Single Device Data Correction (SDDC) function is supported.

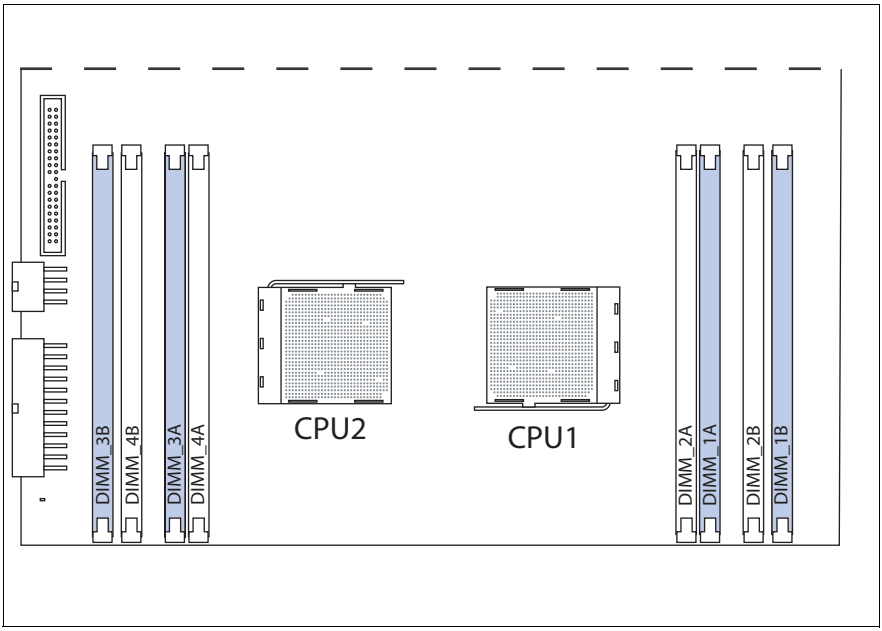

Figure 2: Main memory

Module population

– The memory modules have to be populated in pairs.

– Each pair must consist of identical memory modules.

– The module capacity between pairs can differ: for example pair 1A/1B can be populated with two 512 Mbyte modules and pair 2A/2B with two 1 Gbyte modules.

Following table shows the possible module population:

X = populated
- = empty

For one CPU:

Memory bank DIMM no. color	**1 DIMM _1A blue**	**2 DIMM _2A black**	**1 DIMM _1B blue**	**2 DIMM _2B black**	**DIMM _3A blue**	**DIMM _4A black**	**DIMM _3B blue**	**DIMM _4B black**
Population with 2 DIMMs	**X**	-	**X**	-	-	-	-	-
Population with 4 DIMMs	**X**	**X**	**X**	**X**	-	-	-	-

For two CPUs:

Memory bank DIMM no. color	**1 DIMM _1A blue**	**3 DIMM _2A black**	**1 DIMM _1B blue**	**3 DIMM _2B black**	**2 DIMM _3A blue**	**4 DIMM _4A black**	**2 DIMM _3B blue**	**4 DIMM _4B black**
Population with 2 DIMMs	**X**	-	**X**	-	-	-	-	-
Population with 4 DIMMs	**X**	-	**X**	-	**X**	-	**X**	-
Population with 6 DIMMs	**X**	**X**	**X**	**X**	**X**	-	**X**	-
Population with 8 DIMMs	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**

3.3 Slots

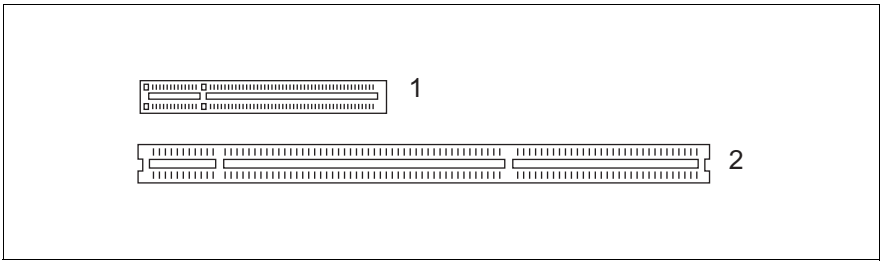

Figure 3: Slots

PCI slots

The following table shows an overview of the slots:

Slot	64 bit/ 32 bit	Frequency in MHz	Description
1	8x	100	8X PCI Express
2	64 bit	133	64-Bit PCI bus slot, full size or low profile

3.3.1 ISA bus resources

Device	**IRQ**	**Address**	**DMA**
Timer	0	040-043	
Keyboard	1	060,064	
Serial port COM1	4	**3F8-3FF**	
Real-time clock (RTC)	8	070-071	
Microsoft ACPI-compliant	9		
Mouse controller	12		
Numeric processor	13	0F0-0FE	
IDE controller (primary)	14	1F0-1F7, 3F6	

"IRQ" = interrupt assigned as shipped

"Address" = this address can be used for your particular device

"Address" = this DMA can be used for your particular device

Default settings are shown in bold print

3.3.2 PCI resources

PCI IRQ Line x - Assignment of the PCI interrupts

PCI IRQ Line x defines which ISA interrupts are used for the PCI-X and PCI Express slots.

If you select *Auto* in the BIOS setup, the interrupts are assigned automatically and no further settings are required.

Multifunctional PCI boards or boards with an integrated PCI-to-PCI bridge can use several PCI interrupts (INTA#, INTB#, INTC#, INTD#). Monofunctional PCI boards (default) only use one PCI interrupt (INTA#) per PCI slot.

The PCI interrupts INTA#, INTB#, INTC# and INTD# are available for each PCI slot.

The same interrupt can be assigned simultaneously to several PCI boards. You should avoid this condition due to reduced performance.

If you use a setting other than *Auto*, the Plug&Play functionality of the system BIOS for the corresponding PCI boards is deactivated.

Auto The PCI interrupts are assigned automatically in accordance with the Plug&Play guidelines.

Disabled No ISA interrupt is assigned to the PCI interrupt.

3, 4, 5, 7, 9, 11, 12, 14, 15

The selected ISA interrupt is assigned to the PCI interrupt. You may not select an ISA interrupt that is used by a component on the system board (e.g. controller) or an ISA board.

Following table shows the PCI IRQ routing:

Device	IDSEL	PCI_IRQ	REQ/GNT
VGA/Radeon 7000M	P3_AD21	PCIIRQ#8	P3REQ#0 / P3GNT#0

Following table shows the PCI -X133 MHz IRQ routing:

Device	IDSEL	PCI_IRQ	REQ/GNT
PCI-X	P2_AD17	PCIIRQ#0 / PCIIRQ#1 / PCIIRQ#2 / PCIIRQ#3	P2_REQ#0 / P2_GNT#0

IDSEL: ID Select
PCI_IRQ: PCI Interrupt Request
REQ/GNT: Request / Grant

3.4 Screen resolution

Depending on the operating system used the screen resolutions in the following table refer to the screen controller on the system board. If you are using an external screen controller, you will find details of supported screen resolutions in the operating manual or technical manual supplied with the controller.

Screen resolution	Refresh rate (Hz)	Max. number of colours
640x480	200	4.29 G
800x600	200	4.29 G
1024x768	160	4.29 G
1280x1024	100	4.29 G

3.5 Temperature / system monitoring

Temperature and system monitoring aim to reliably protect the computer hardware against damage caused by overheating. In addition, any unnecessary noise is also prevented by reducing the fan speed, and information is provided about the system status.

The temperature and system monitoring are controlled by an onboard controller developed by Fujitsu Siemens.

The following functions are supported:

Temperature monitoring

Measurement of the processor temperature, measurement of the ambient temperature by a temperature sensor on the front panel board. When temperature exceeds warning level high an alert will be generated. When temperature exceeds critical level the system will be shutdown.

Fan monitoring

Fans that are no longer available, blocked or sticky fans are detected.

Fan control

The fans are regulated according to temperature.

Sensor monitoring

The removal of, or a fault in, a temperature sensor is detected. Should this happen all fans monitored by this sensor run at maximum speed, to achieve the greatest possible protection of the hardware.

Voltage monitoring

When voltage exceeds warning level high or falls below warning level low an alert will be generated.

System Event Log (SEL)

All monitored events of the system board are signalised via the Global Error LED and recorded in the System Event Log. They could be retrieved in the BIOS Setup or via ServerView.

3.6 Interfaces and connectors

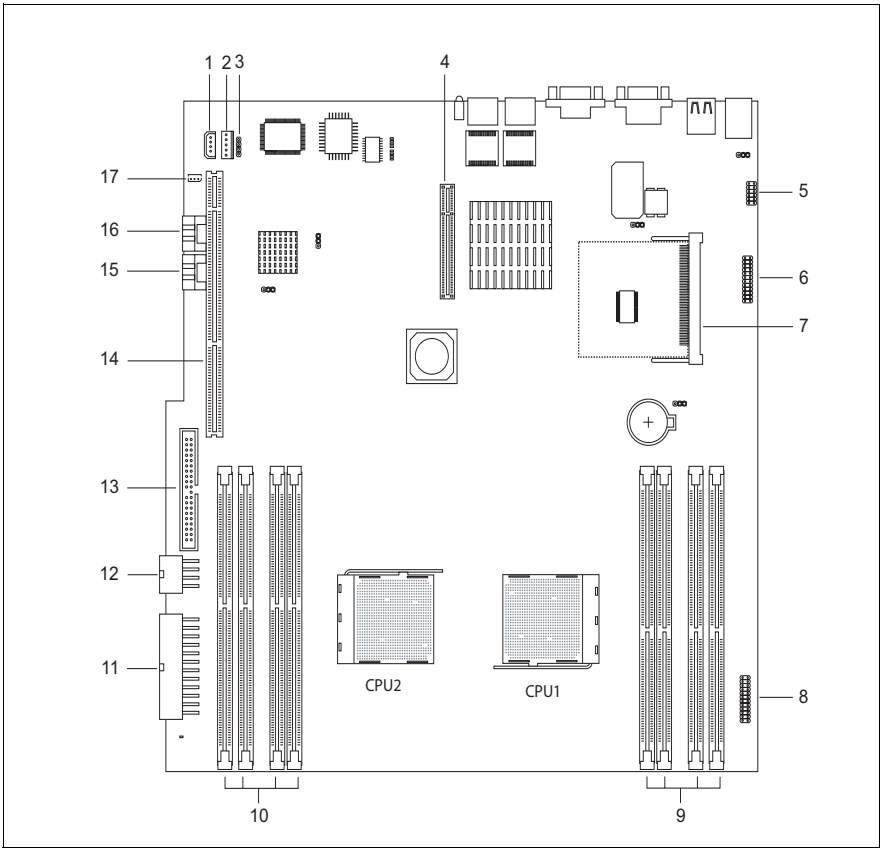

Figure 4: Schematic overview of the system board D2130

1 = IPMB connector
2 = Auxiliary power connector for RSB S2 LP
3 = HDD activity LED connector
4 = PCI Express x8 slot
5 = USB connector
6 = Front panel connector
7 = BMC socket
8 = Connector for fan backplane
9 = DDR1 DIMM slots for CPU1
10 = DDR1 DIMM slots for CPU2
11 = 24-pin ATXPWR connector
12 = 8-pin ATX12V connector
13 = IDE connector
14 = PCI-X slot
15 = SATA2 connector
16 = SATA1 connector
17 = SATA LED controller

3.6.1 External connectors

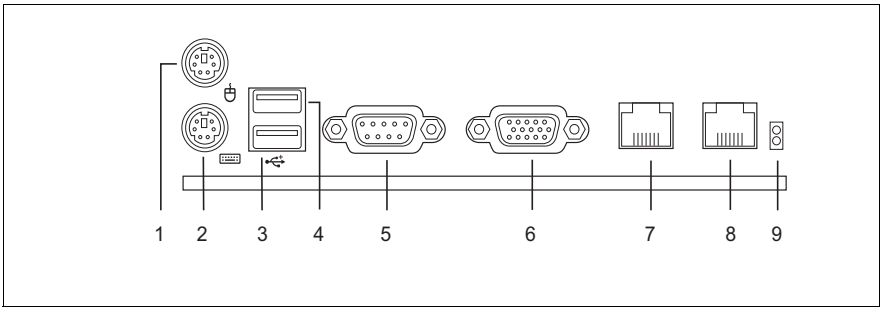

Figure 5: External ports of the system board D2130

1 = PS/2 mouse port

2 = PS/2 keyboard port

3 = USB port 0

4 = USB port 1

5 = Serial port COM1

6 = VGA port

7 = LAN port A (10/100/1000 MBps)

8 = LAN port B (10/100/1000 MBps)

9 = LEDs (Identify-LED and Status-LED)

LEDs

LED	Indicator	Meaning
bottom: Identify-LED	blue	server is identified via ServerView
top: Status-LED (Global Error)	orange orange flashing	indicates a prefailure indicates a failure. Reasons for a failure may be: - overheating of one of the sensors - sensor defect - fan defect - CPU error - software detected an error

LAN ports

On this system board you will find two LAN ports on the rear panel. The dual embedded Broadcom Gigabit LAN controllers support transfer rates of 10 Mbit/s, 100 Mbit/s and 1 Gbit/s. The LAN controller supports WOL function through Magic Packet™.

The LAN controller connectors are equipped with two LEDs (light emitting diode). The left hand LED indicates the activity, the right hand LED is without function.

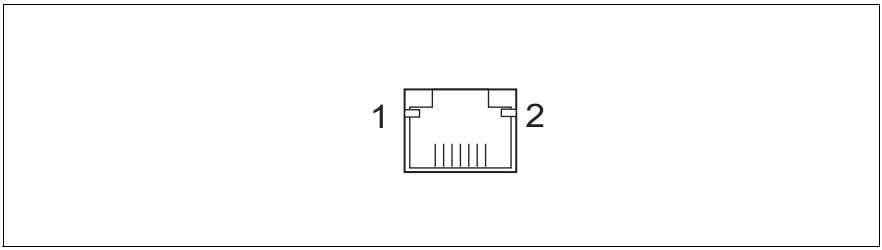

Figure 6: LAN port

1	LAN link/aktivity	green	on	LAN connection
			off	no LAN connection
			flashing	LAN transfer
2	no function			

3.7 Settings with jumpers

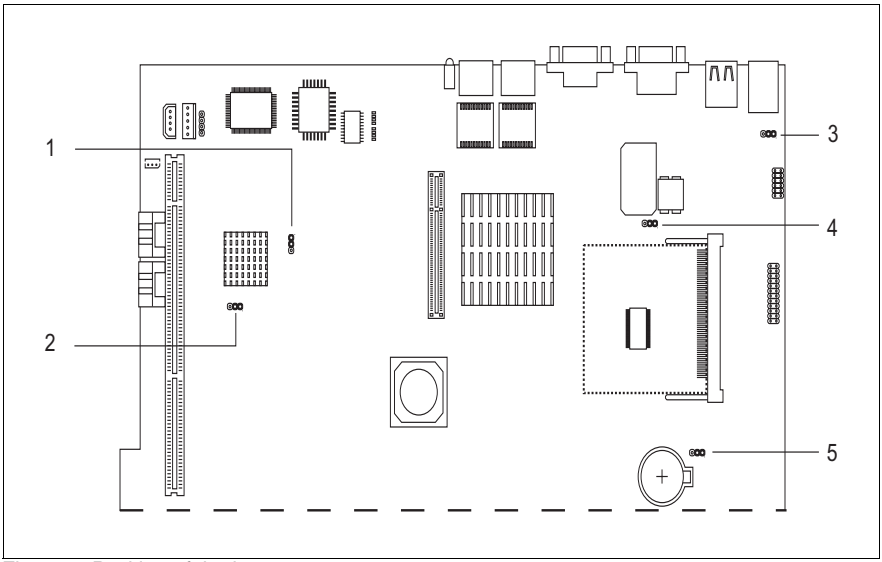

Figure 7: Position of the jumpers

1 = BIOS recovery - (RECOVERY1)

1-2 Normal (default setting)

2-3 Force BIOS recovery

2 = SATA controller (SATA_EN1)

1-2 Enabled (default setting)

2-3 Disabled

3 = Keyboard power (KBPWR1)

1-2 +5V (default setting)

2-3 +5VSB

4 = VGA controller (VGA_EN1)

1-2 Enabled (default setting)

2-3 Disabled

5 = Clear CMOS / RTC (CLRTC1)

1-2 Normal (default setting)

2-3 Clear RTC

4 Replacing the lithium battery

In order to save the system information permanently, a lithium battery is installed to provide the CMOS-memory with a current. When the charge is too low or the battery is empty, a corresponding error message is provided. The lithium battery must then be replaced.

CAUTION!

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer (CR2032).

Do not throw lithium batteries into the trashcan. It must be disposed of in accordance with local regulations concerning special waste.

Make sure that you insert the battery the right way round. The plus pole must be on the top!

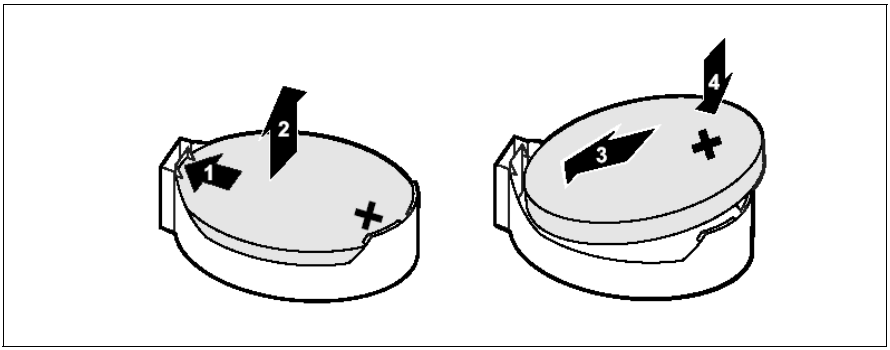

Figure 8: Replacing the lithium battery

- ► Press the locking spring into direction of of the arrow (1), so that the lithium-battery jumps out of its socket.
- ► Remove the battery (2).
- ► Insert a new lithium battery of the same type into the socket (3) and (4).

Abbreviations

The technical terms and abbreviations given below represent only a selection of the full list of common technical terms and abbreviations.

Not all technical terms and abbreviations listed here are valid for the described system board.

AC
Alternating Current

ACPI
Advanced Configuration and Power management Interface

ANSI
American National Standards Institute

ASR&R
Automatic Server Recovery and Restart

ATA
Advanced Technology Attachment

BBU
Battery Backup Unit

BIOS
Basic Input Output System

BMC
Baseboard Management Controller

CMOS
Complementary Metal Oxide Semiconductor

COM
COMmunication port

CPU
Central Processing Unit

DDR
Double Data Rate

DIMM
Dual In-line Memory Module

DIP
Dual In-line Package

DMI
Desktop Management Interface

DRAM
Dynamic Random Access Memory

ECC
Error Correction Code

EEPROM
Electrical Erasable Programmable Read Only Memory

EFI
Extensible Firmware Interface

EGB
Elektrostatisch gefährdete Bauteile

EMI
Electromagnetic interference

EMRL
Embedded RAID Logic

EMV
Elektromagnetische Verträglichkeit (electromagnetic compatibility)

EPROM
Erasable Programmable Read Only Memory

ESD
ElectroStatic Discharge (elektrostatische Entladung)

EVRD
Enterprise VRD

HPC
Hotplug Controller

FPC
Front Panel Controller

FRU
Field Replaceable Unit

FSB
Front Side Bus

ICE
In Circuit Emulation

IDE
Integrated (intelligent) Drive Electronics

IEC
International Electrotechnical Commission

IME
Integrated Mirroring Enhanced

IOOP
Intelligent Organisation Of PCI

IPMB
Intelligent Platform Management Bus

IPMI
Intelligent Platform Management Interface

ISO
International Organisation for Standardisation

LAN
Local Area Network

LED
Light Emitting Diode

MPS
Multi Processor Specification

NMI
Non Maskable Interrupt

OEM
Original Equipment Manufacturer

OHCI
Open Host Controller Interface

OS
Operating System

PCI
Peripheral Components Interconnect

PDA
Prefailure Detection and Analyzing

PIO
Programmed Input Output

PDB
Power Distribution Board

PLD
Programmable Logic Device

PS(U)
Power Supply (Unit)

PWM
Pulse Wide Modulation

PXE
Preboot eXecution Environment

RAID
Redundant Array of Inexpensive Disks

RoHS
Restriction of the Use of Certain Hazardous Substances (Waste from Electric and Electronic Equipment, EU Directive)

RoMB
RAID on Motherboard

RSB
Remote Service Board

RST
ReSeT

RTC
Real Time Clock

SCSI
Small Computer Systems Interface

SDDC
Single Device Data Correction

SDRAM
Synchronous Dynamic Random Access Memory

SEL
System Event Log

SHDG
Server Hardware Design Guide

SMB
System Management Bus

SMM
Server Management Mode

SMP
Symmetrical Multi Processing

UHCI
Unified Host Controller Interface

USB
Universal Serial Bus

VGA
Video Graphics Adapter

VRD
Voltage Regulator Down

VRM
Voltage Regulator Module

WEEE
Waste from Electric and Electronic Equipment (EU Directive)

WfM
Wired for Management

WOL
Wake up On LAN

Fujitsu Siemens Computers GmbH
User Documentation
81730 Munich
Germany

Fax: (++49) 700 / 372 00000

email: manuals@fujitsu-siemens.com
http://manuals.fujitsu-siemens.com

Comments
Suggestions
Corrections

Submitted by

Comments on System board D2130 for RX220
Technical manual

Fujitsu Siemens Computers GmbH
User Documentation
81730 Munich
Germany

Fax: (++49) 700 / 372 00000

email: manuals@fujitsu-siemens.com
http://manuals.fujitsu-siemens.com

Comments
Suggestions
Corrections

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Comments on System board D2130 for RX220
Technical manual

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